El Niño Briefing for SE California & SW/SC Arizona

NOAA/NWS Phoenix, AZ

Issued: December 17, 2009

Overview

The term El Niño refers to the large-scale ocean-atmosphere climate phenomenon linked to a periodic warming in sea surface temperatures across the central and east-central equatorial Pacific Ocean. El Niño represents the warm phase of the El Niño/Southern Oscillation, or ENSO, cycle.

The current El Niño remains border-line between a moderate and strong event. Based on observational and model data, El Niño is expected to remain moderate/strong through Winter 2009-2010 and continue into Spring 2010. There will be an increased chance for above normal rainfall this winter across southeast California and southwest/south-central Arizona.

Past and Current Conditions

After warming sharply during October, sea surface temperature (SST) anomalies in the Niño 3.4 region (blue box, Fig. 1) have leveled off and remain near +1.8 °C (Fig. 2). The threshold for El Niño conditions is +0.5 °C, with values above +1.5 °C considered strong. The peak of SST anomalies is likely occurring now, though the atmospheric response will continue for many more months. Due to the high heat content of water, El Niño conditions may continue through Spring 2010.

The most recent Oceanic Niño Index (ONI), a three-month average of SST anomalies in the Niño 3.4 region, computed for the period September 2009 through November 2009, was +1.2 °C. An El Niño episode is said to have occurred when the ONI was at-or-above 0.5 °C for at least five consecutive three-month periods. The ONI for the current event has been above +0.5 °C since the May-July 2009 time period, making this officially a full-fledged El Niño episode. The last El Niño episode occurred in 2007-2008.

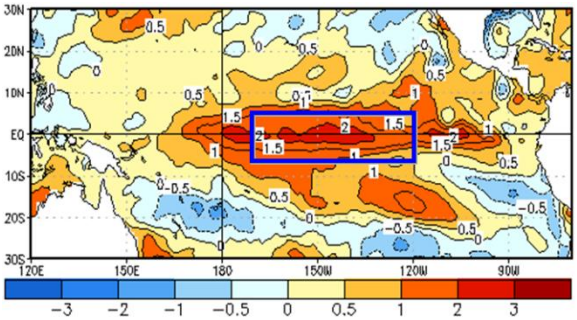

Figure 1 – Average SST anomalies in the Pacific Ocean, from 15 November 2009 through 12 December 2009. The blue box represents the Niño 3.4 region where the most recent weekly temperature anomaly was +1.8 °C, similar to last month.

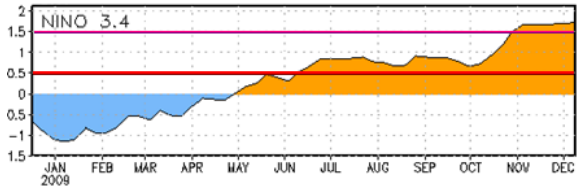

Figure 2 – SST anomalies in the Niño 3.4 region since winter 2008-2009. Values above +0.5 ºC (thick red line) indicate El Niño conditions with values above +1.5 °C (thin magenta line) generally classified as "strong". Note that SST anomalies are currently above the strong threshold.

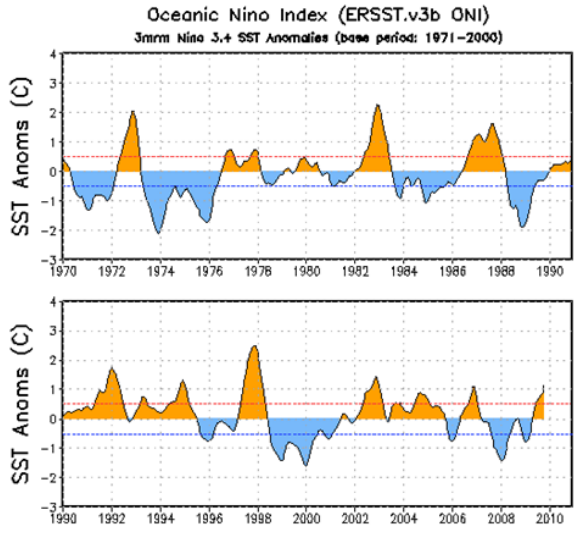

Figure 3 – ONI values for the past twenty years. The last El Niño episode occurred in 2007-2008. The most significant episodes during this timeframe were the 1982-1983 and 1997-1998 events. While the current episode will not be as significant as those, it may eventually be the strongest one since the 1997-1998 episode.

An analysis of how the current event is unfolding compared to past events was performed using the ONI data. Figure 4 compares the 2009 ONI values from December-January-February through August-September-November to the past 59 years worth of data. It was found that six other years show very similar characteristics to 2009. Using those six years, composite temperature and precipitation anomaly maps were generated for the following winters (December through March, Fig. 5).

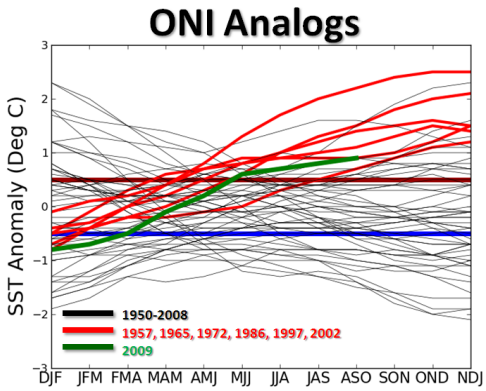

Figure 4 – Plot of ONI values for each year (1950-2008, gray lines). 2009 (through the fall) is plotted in green. The six years most similar to 2009 (through the fall) are plotted in red.

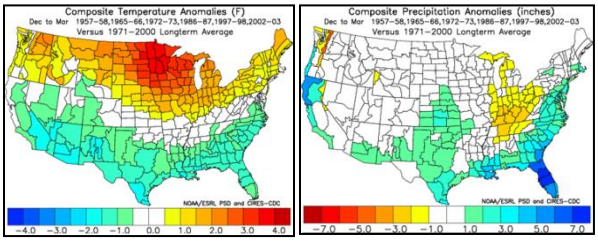

Figure 5 – Temperature (left) and precipitation (right) analog composites based on six previous years with similar evolutions in El Niño conditions to 2009. These maps represent possible outcomes for this winter based on past similar events.

The patterns found are similar to what is expected during an El Niño event. Average seasonal temperatures are warmer than normal across the northern U.S. and cooler across the southern U.S. Precipitation is enhanced along the California coast, Southwest and Southern Plains states, and the Southeast and Middle Atlantic regions with a decrease over the Pacific Northwest, Ohio Valley, and Lower Great Lakes regions.

Outlook

The large-scale weather pattern during the past month has, at times, resembled what is typically expected during an El Niño event - a strong sub-tropical jet with intrusions of tropical moisture. As the winter continues, this pattern will likely be the dominant mode, though there will be fluctuations.

The official January-February-March Outlook from CPC calls for equal chances for the average three month temperature to be above, near, or below normal across the Southwest (Fig. 6). There will be an increased chance for the three month total precipitation to be above normal for the same area (Fig. 7). The official forecast, while similar to the analogs in Figure 5, is created using additional forecast tools including dynamic climate models, soil moisture data, and recent trends.

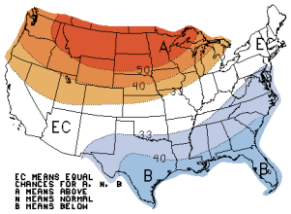

Figure 6 – Jan-Feb-Mar Temperature Outlook.

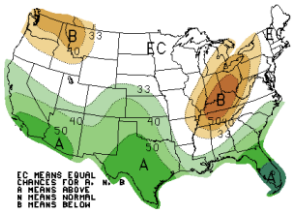

Figure 7 – Jan-Feb-Mar Precipitation Outlook.

Additional Information

NOAA CPC ENSO Page:
http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/enso.shtml

NOAA El Niño Page:
http://www.elnino.noaa.gov

NOAA CPC Outlooks:
http://www.cpc.ncep.noaa.gov/products/predictions/30day/

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Next Update: January 28, 2009